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Gould et al.

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[54] **POLYURETHANE QUATERNARY AMMONIUM SALTS**

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[52] **U.S. Cl.** ..... **528/71**; 528/59; 528/65; 528/73; 528/76; 528/80; 528/84; 528/44; 128/82; 128/155; 128/334 R; 128/334 C; 128/130; 128/132 D; 128/156; 424/78; 424/32; 351/160 R

[58] **Field of Search** ..... 528/71, 59, 65, 73, 528/76, 80, 84, 44; 128/82, 155, 334 R, 334 C, 348, 130, 132 D, 156; 424/78, 32; 351/160

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[57] **ABSTRACT**

Polyurethane quaternary ammonium salts are obtained by heating a solution of a polyurethane resin characterized by having present in the polymer backbone hydroxyl groups and at least one substituent selected from the group consisting of carboxylate radicals and carboxyl radicals dissolved in a water-miscible organic solvent for the resin at a temperature above 64° C. and below the decomposition temperature of said polyurethane resin with an organic chloride for a period of time; adding a strong base to the reaction mixture and continuing to heat said mixture to form a polyurethane quaternary ammonium hydroxide in solution; and precipitating the polyurethane quaternary ammonium hydroxide by pouring the reaction mixture into an excess of water. The polyurethane quaternary ammonium hydroxide so obtained may be dissolved in a solvent containing sufficient hydrochloric acid to bring the pH of the solution to 8; and the corresponding polyurethane quaternary ammonium chloride may be recovered from solution by evaporation of the solvent at a temperature below the decomposition point of the polyurethane quaternary ammonium chloride. A polyurethane quaternary ammonium sulfate may be prepared by dissolving in sulfuric acid a polyurethane resin characterized by having present in the polymer backbone hydroxyl groups and lactone groups to form a solution. This solution is added to an excess of water with stirring and neutralized with sodium hydroxide to bring the pH of the diluted solution to between 3 and 4. Evaporation of the solvent gives a residue containing a polyurethane quaternary ammonium sulfate and sodium sulfate. The polyurethane quaternary ammonium sulfate may be separated from the mixture by extraction with methanol.

2 Claims, No Drawings